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School based CBT targeting anxiety in children with ASD: a quasi-experimental randomised controlled trial incorporating a mixed methods approach.

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Children with a diagnosis of autism are more likely to experience anxiety than their typically developing peers. Research suggests that Cognitive Behavioural Therapy (CBT) could offer a way to help children with autism manage their anxiety but most evidence is based on clinical trials. This study investigated a school-based CBT programme using a quasi-experimental design incorporating the child and parent versions of the Spence Children's Anxiety Scale (Spence, 1997) and the Coping Scale for Children and Youth (Brodzinsky, et al. 1992). Interview data was incorporated to help understand the process of change further. Children in the experimental condition had lower levels of anxiety, maintained at follow-up and changes were found in coping behaviours such as lower behavioural avoidance strategies but increased problem solving strategies at follow-up. Limitations of the research together with future directions are also discussed.

Introduction

Autism is classified as a Pervasive Developmental Disorder in the Diagnostic and Statistical Manual version 4, text revised (DSM-IV-TR: APA, 2000)[1] in which a person has difficulties with social interactions, communication and stereotyped or rigid behaviours and interests, also known as the triad of impairments. Epidemiological studies suggest that in the UK around 1% of all children meet the criteria for a diagnosis of autism (Baird, *et al*., 2006; Baron-Cohen, *et al*., 2009). Due to the difficulties children with autism have with social behaviours Osler and Osler (2002) and Humphrey (2008) identify them at risk of scholastic underachievement and social isolation within school settings, with studies showing children with autism more likely to underachieve than IQ matched typically developing peers (Ashburner, *et al.*, 2010).

Not only are children with autism at risk of scholastic underachievement and social isolation, but that are also more at risk for mental health difficulties. Simonoff,, *et al*., (2008) and Kussikko, *et al*., (2008) found that children with autism were more likely to have comorbid social anxiety disorders than typically developing peers, with

[1] Although the American Psychiatric Association released the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-V: American Psychiatric Association, 2013) which changed the definition of ASD this research and the cited references were all conducted prior to its release so the DSM-IV definition has been retained.

a meta-analysis reporting 40% of children with autism presenting with an anxiety disorder (van Steensel *et al*., 2010), with the level of social anxiety correlating with the child's feelings of social isolation. A longitudinal study by Simonoff, *et al*., (2012) found that these comorbid difficulties were moderately stable over a four year period, but the risk factors associated with mental health difficulties in the general population were poor predicators for mental health difficulties in children with autism, suggesting different developmental trajectories.

Research has tried to identify the comorbidity between autism and anxiety. Wood and Gadow (2010) highlight the difficulty assessments have at separating autism and anxiety, with some autism symptoms (such as a reluctance to engage or withdrawal from social interactions) being reflected in anxiety questionnaires, which may conflate the comorbidity of anxiety in children with autism, leading to a high comorbidity rate. They propose that anxiety in children with autism may be present due to three reasons: continued social rejection leading to heightened stress levels; that the core autism symptoms could be heightened by stressors; and as an alternative measure to core autism symptoms. Some authors have also questioned if anxiety in children with autism is atypical to that of typically developing children (Kerns and Kendall, 2012).

Cognitive Behavioural Therapy (CBT) has been shown to have positive effects supporting anxious youth (Chu and Harrison, 2007), producing moderate to large effects. As the name suggests, it primarily focuses on both the cognitive (thoughts) and behaviours towards a situation, although therapists can place more emphasis on the behavioural or cognitive aspects of the therapy depending on their skills and experience (Graham, 2005). CBT supports an individual's understanding of environments or contexts that cause anxiety (psychoeducational component) and to

help challenge the cognitions a person may hold towards those contexts through strategies such as perspective taking and behavioural strategies, such as exposure to help build up and reflect on thoughts and feelings towards certain situations. An advantage of CBT is that it can be delivered in one-to-one or to small groups contexts; it can also be delivered as part of a modular system; as part of a manualised programme and can be delivered in a set number of weeks or through ongoing support, until a particular outcome is reached. CBT's flexibility allows it to be specifically researched through empirical means.

There is an increasing body of evidence to suggest that CBT is an effective treatment to use with children with autism who have anxiety (Chalfrant, *et al.*, 2007; Sofrnoff, *et al*., 2005; Sze and Wood, 2007; White, *et al*., 2009; Wood, *et al.,* 2009). These studies have incorporated single and multiple case studies (Sze and Wood, 2007; White, *et al*., 2009) and controlled trials (Chalfrant, *et al*., 2007; Sofronoff, *et al.,* 2005). The research indicates that children who receive CBT respond well to treatments that vary in range from 6 weeks (Sofronoff, *et al.,* 2005) up to 16 weeks (Wood, *et al*., 2009), who receive a modular CBT programme (White, *et al*., 2009) and who receive a manualised treatment programme (Sofronoff, *et al.,* 2005). The research also indicates that the effects of CBT are maintained at post-intervention, at 6 week follow-up (Sofronoff, *et al.,* 2005) and 12 week follow-up (Chalfrant, *et al*., 2007). Encouragingly, there is also a body of research to suggest that group based CBT programmes can be used to support children with autism manage their anxiety (McConachie, *et al.,* 2014; Reaven, *et al*., 2012).

The evidence is encouraging and provides support to using CBT as an effective programme to use with children with autism. However, the current research, which is mostly empirically based, does not provide clarity about the process of

change, or factors influencing change when engaging children with autism with CBT. Kazdin (2000) proposed that research into therapeutic approaches used with children should focus on what mechanisms cause the therapeutic change, rather than a focus on a reduction of the symptoms. Highly anxious children often perceive themselves as unable to cope with demanding situations preferring avoidance as the main coping response (Ollendick, *et al.,* 2001), however the changes in children's coping styles from avoidance to more active approaches, which are thought to lead to better treatment outcomes (Compas, *et al.,* 2001), have yet to be properly understood (Prins and Ollendick, 2003).

Another limitation of the current research is the context where the studies take place which are often clinic based. The advantage of CBT is that it can be delivered through manualised programmes by a range of professionals in a variety of different contexts, evaluations of these interventions in other contexts could lead to more community based mental health support programmes for children with autism. Schools have the potential to be important and accessible bases in which to deliver CBT programmes. Schools require a high degree of social skills, which may increase levels of anxiety in children with a diagnosis of autism. Delivering interventions within schools could help with the generalisation of skills from one context to another and minimise the disruption to education that is caused by children and young people needing to travel to clinics. Furthermore, in the UK there has been a clear government agenda to increase access to mental health support in schools for over a decade, including the *Targeted Mental Health in Schools Programme* (DCSF 2008), which aimed to transform the delivery of mental health support to the 5-13 age range through the delivery of school based interventions. The most recent government advice to schools *Mental Health and Behaviour in Schools,* (DFE 2014), has the

stated aim to 'help schools promote mental health in their pupils and identify and address those less severe problems at an earlier stage and build their resilience' (p.4). In the context of these government requirements it is important, therefore, to investigate the use of CBT in schools. A meta-analysis, however, of CBT used with anxious youths found differing outcomes depending on if the intervention took place in a university or other clinical setting (Ishikawam, Okajima, Matsuoka and Sakano, 2007) which suggests that interacting contextual, treatment fidelity, supervision and therapist's level of experience may impact on overall effectiveness. Furthermore, there are a number of other goods reasons for conducting the research in a school setting: it provides readily accessible support in a familiar context, the children are in a socially demanding context immediately prior to taking part in the CBT programme and again immediately after the treatment has ended, and that a child's initial levels of anxiety may be different in a school than a clinic, which may have an impact on treatment effectiveness, all of these factors need to be studied in more detail.

This report aims to address some of the factors mentioned above and aims to investigate two hypotheses. The first hypothesis aims to investigate if children with a diagnosis of autism who take part in a school-based CBT programme show lower levels of anxiety than a control group. The second hypothesis aims to investigate if children with a diagnosis of ASD who take part in a CBT programme show different coping mechanisms and engage in less avoidance strategies than the control group. To investigate the process of change and to look at possible maintenance factors towards anxiety in children with autism, this report also incorporates interview data into the analysis using a mixed methods approach.

Method

Participants

This study was approved by the ethics committee at the UCL Institute of Education. Schools were invited to participate in the study by an email that was circulated to all secondary schools in two geographical areas within a large county in the South East of England that described the project's purpose and aims. Contact visits were arranged with the Special Educational Needs Coordinators (SENCos) who expressed an interest in the project. Initial conversations with school centred on anxiety in children with autism and its presentation, with children identified to take part based on the school's concern rather than by formal diagnosis (see Diagram 1 for a flow diagram of school and participant recruitment). The only requisite for participation in the study was the requirement for all children to have a multidisciplinary assessment of autism, with reports to validate their diagnosis that conformed to either the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text revision; DSM-IV-TR) or the International Classification of Diseases, 10th Revision (World Health Organisation (WHO), 1993). In total the six schools identified 37 children with autism where heightened levels of anxiety were a concern, with 28 parental consent forms being returned. Discussions were held with the children to explain the project, its aims, the time commitments and their right to withdraw. All children agreed to take part in the study. One child was from an ethnic Chinese background, and the others

were White British (see Table 1 for demographic data). At the time the study started none of the participants had an additional comorbid diagnosis reported by either the parents or school. However, during the study two children were referred to the local child mental health service for an assessment of Attention Deficit and Hyperactivity Disorder. All children who took part in the study were in Key Stage 3 of the National Curriculum in the UK, reflecting ages between 11 and 14 years.

There were not enough children identified at each school to run both a control and experimental group. The authors decided, therefore, to run one group at each school and randomly allocate the school to either the control or experimental group. Schools were each given a number and an online random number generator was used to allocate the schools to either the control or experimental conditions (see diagram 1 for group compositions and numbers).

Data was collected at three time points: T1 was after consent was agreed by parent and child; T2 was immediately after the 6 week CBT programme had ended; and T3 at 6- to 8-weeks after intervention had ended (see Table 2 for data collection schedule). All participants in the control group received the intervention after T3 data had been collected.

Intervention

This study used Attwood's (2004) Exploring Feelings: Cognitive Behavioural Therapy to Manage Anxiety for children aged 10-12. Although this study had children of a higher age range the lead author, in discussion with school staff, felt the programme would still be suitable for all children in the study This programme, which

is delivered in six weekly sessions each lasting approximately one hour, is designed to be used with children with a diagnosis of ASD who have difficulties in managing their anxiety. This programme was chosen because it was specifically designed for children with autism and consists of aspects which are regarded as good practice when supporting children with autism, such as comic strip conversations and visually presented material. An additional advantage was that we could replicate the data of Sofronoff, Attwood and Hinton (2005). The intervention lasted for 6 weeks with children attending once a week for an hour. Each session consisted of:

Session one: This session explored the participants' strengths and special talents. It highlighted things they like about their physical appearance and intellectual qualities. It asked the children how they recognise they are happy through facial expressions and their physiology. The session then explored with the children how they know they are relaxed by their thoughts and physiology, such as heart rate and breathing. The participants were asked to complete homework which asked them to make a note of things they were happy about in their room, with their friends and about their weekends, and to find pictures which make them feel relaxed.

Session two: This session explored the participants' bodily state when they are anxious by asking about their heart rate, breathing, facial muscles and speech. It then asked the participants to think about a hero and a time they have felt anxious, and to also think about times when the participants themselves have felt anxious and to talk about how they coped with these feelings. The participants were asked to think about relaxation techniques.

Session three: This session explored the participants' relaxation techniques. It asked the participants to think about how they would help a friend or family member who was feeling anxious and how this friend and family member could help them. It then explored thinking tools, such as perspective-taking, using their imagination, humour and acting. The session also explored inappropriate tools. The participants were asked to think about times when they have used their relaxation techniques and how well they worked.

Session four: This session recapped session three and talked about how the participants have used their relaxation techniques. It then asked the participants to think of situations which have made them anxious and to place their level of anxiety on a thermometer and then reflect about what would or might have happened if they had used their relaxation techniques.

Session five: This session asked the participants to write a social story which would help them understand situations which make them feel anxious. It then asked the participants to think about negative thoughts, such as 'I'm a loser,' and calm thoughts, such as 'I am going to show how mature I am.' It then asked the participants to think about thoughts which they can have instead of negative thoughts such as 'everyone hates me.'

Session six: This session asked the participants about which relaxation tools they had found to be the most effective and then to write a social story about a situation and a plan of what they can do. It then asked the participants to think about what thoughts they can use instead of negative thoughts.

The intervention was delivered to all the groups by the first author, who at the time was completing his Doctorate in Child and Adolescent Educational Psychology. As part of the doctorate the first author received intensive training and weekly supervision to deliver Cognitive Behavioural Therapy to children.

Measures

Measures were split into three categories: descriptive, outcome and qualitative.

Descriptive data

Descriptive measures were collected once at pre-intervention from the children before the intervention started. Descriptive measures aim to provide the reader with an idea of the children who took part in this research. In particular, the measures aimed to help to understand the level of cognitive abilities in the children who took part in the intervention and their level of social reciprocal behaviour. Both of these measures can be used to help make inferences about the data in terms of its generalisability to other children with ASD.

Wechsler Abbreviated Scale of Intelligence (Harcourt Assessment, 1999)

The Wechsler Abbreviated Scale of Intelligence (WASI) is a brief measure of cognitive ability which consists of vocabulary, block building, similarities and matrices; together these scores provide a full-scale cognitive ability, verbal ability and non-verbal ability. Standardised on 1,100 children aged between six and 16, the WASI shows high reliability coefficients (average reliability ranging from .81 to .96 on all scales for all age ranges). Correlations were made with the Wechsler

Intelligence Scale for Children version III (WISC-III; Wechsler, 1991), and for the verbal IQ, performance IQ and the full-scale IQ, correlation coefficients were .88, .84 and .92 respectively. This suggests that the WASI is a good measure of cognitive ability in children.

Social Responsiveness Scale (Constantino, 2002)

The Social Responsiveness Scale (SRS) is a brief 65-item measure which can be completed by parents or the child's caregivers, and teachers, providing scores for the child's social awareness, social cognition, social communication, social motivation, and autistic mannerisms and a single score for autistic social impairment. The factor structure of the SRS supported the three areas which suggest the presence of ASD (social interaction, communication and stereotyped/repetitive behaviours) as a continuous factor, which is consistent with the definition provided by the DSM-IV. Test-retest reliability coefficients were tested on a sample of 1,900 children aged five to 15; coefficients came out at .88. Constantino, *et al*., (2003) compared the SRS against the Autism Diagnostic Interview – Revised and found comparable correlations between them (ranging between .52 and .79). Discriminant validity of the SRS suggests that high scores on the SRS were associated with the diagnosis of ASD, and not other child psychiatric conditions, such as psychotic disorder, mood disorder and Attention Deficit and Hyperactivity Disorder, which further suggest this scale is suitable to discriminate children with ASD. The author of the scale suggests that a T-score of above 75 suggest a clinical presence of ASD.

<u>Outcome data</u>

Outcome measures are those which help to understand the effectiveness of the intervention. These measures were collected at pre- and post-intervention, which would allow comparisons to be made as to the effectiveness of the intervention helping children with ASD manage their anxiety, and the way they cope with stressors in their environment which could cause anxiety. In addition this study aimed to understand changes which may occur in children's coping behaviours of those who took part in the intervention.

Spence Children's Anxiety Scale (Spence, 1997)

The Spence Children's Anxiety Scale (SCAS; Spence, 1997) is a 44-item questionnaire which can be completed by either the child or parent. The score on the questionnaire can then be aggregated into sub-categories of anxiety: panic attack and agoraphobia, separation anxiety, physical injury fears, social phobia, obsessive compulsive, generalised anxiety and a total anxiety score.

The SCAS was validated on a community sample of 4,916 children aged between eight and 15, and uses the DSM-IV (APA, 2000) criteria. Confirmatory Factor Analysis was used to analyse the individual scores. The Confirmatory Factor Analysis confirmed the DSM-IV definition of discrete anxiety disorders in children. The scores are split into separation anxiety, social phobia, obsessive compulsive, panic/agoraphobia, physical injury fears and generalised anxiety. Reliability of the scale was found to be high (.93). The validity of the SCAS was supported through comparisons with the Revised Children's Manifest Anxiety Scale (Reynolds and Richmond, 1978) and was found to be moderately high (.75). Although the reliability

and validity of the scale were analysed using community samples, studies have found it is a useful measure for children with ASD (Sofronoff, *et al*., 2005).

Coping Scale for Children and Youth (Brodzinsky, et al. 1992)

The Coping Scale for Children and Youth (CSCY) was developed to measure coping behaviours in children.. The factor analysis suggested there are four sub-categories of coping behaviours: assistance seeking, cognitive-behavioural problem solving, cognitive avoidance, and behavioural avoidance. Test-retest correlations for all four sub-categories fall within the moderately-high to high range (assistance seeking = .80; cognitive-behavioural problem solving = .80; cognitive avoidance = .81; and behavioural avoidance = .73). Validity was tested using the Kidscope dimensions which showed consistent as expected patterns of correlation. In developing the CSCY, Brodzinsky, *et al*. (1992) used a community sample of children who attended mainstream provision including children with special educational needs.

Qualitative Data

Qualitative data was collected through a semi-structured interview technique described by Cohen, *et al.*, (2007). This approach was preferred as it not only provided a structure that would allow certain ideas and concepts to be discussed that related to the research topic, but it is flexible enough to allow for emergent ideas to be explored further if it was relevant to the research topic in order to understand the process of skill development and the impact of the strategies being introduced. An overview of the semi-structured interview used with the parents and children together with the topics introduced can be seen in Appendix 1.

Data collection

All T1 and T2 data was collected within a one week timescale, all T3 data was collected within a two week timescale. It was intended to gain teacher anxiety ratings for the children taking part in the research. The nature of UK secondary schools, however, where children only touch base with staff for short periods of time outside of class, and the nature of support given to children with autism (social skills groups, key contacts, and additional emotional and academic support) meant finding consistency between the schools of who could fill out the questionnaires was difficult. For this reason, the authors took the decision not to include teacher ratings of anxiety and coping behaviours. A random number generator was used to interview nine children from the experimental condition.

Results

Quantitative data was analysed using SPSS version 22

Analysis of the kurtosis, skewness and equality of variance of key measures indicated that the data met the assumptions underlying parametric tests in terms of normality of distribution and equality of variance between the control and experimental group.

Pre-intervention data analysis

Table 3 shows the means and standard deviation of pre-intervention scores between the experimental and control groups. There were no significant differences in mean scores between the control and experimental group for total WASI scores ($t(1,26)= -1.84$, $p= .07$), SRS scores ($t(1,26)= -.283$, $p= .78$), SCAS parent version ($t(1,26)= .35$, $p= .73$), SCAS child version ($t(1,26)= .38$, $p= .71$), or CSCY subscales cognitive

avoidance (t(1,26)= -.813, p= .42), behavioural avoidance (t(1,26)= .734, p= .47), assistance seeking (t(1,26)= .603, p= .55) or problem-solving (t(1,26)= -.745, p= .46).

Post-intervention data analysis

Analysis of Covariance was used to test differences between groups for anxiety and coping behaviours, using pre-intervention anxiety/coping behaviours as the covariate. Scores from these scales are presented in Table 3.

Significant differences by group were found for SCAS child version (F(2,24)= 54.8, p=< .001, d= .72), SCAS parent version (F(2,24)= 28.3, p= .001 d= .69), behavioural avoidance (F(2,25)=4.29, p=.05, d=.31) and problem-solving (F(2,25)=9.21, p=.01, d=.96).

No significant differences were found for CSCY cognitive avoidance (F(2,25)=2.84, p=.11, d=.63) and assistance seeking (F(2,25)=.47, p=.5, d=.33).

Follow-up data analysis

Analysis of Covariance was used to test differences between groups for anxiety and coping behaviours, using pre-intervention anxiety/coping behaviours as the covariate. Significant differences were found for SCAS child version (F(2,24)= 13.9, p = .003, d= .31), SCAS parent version (F(2,24)= 10.5, p= .003, d= .38), CSCY cognitive avoidance (F(2,25)=11.93, p=.00, d=.95), behavioural avoidance (F(2,25)=8.71, p=.01, d=.40) and problem-solving (F(2,25)=10.89, p=.00, d=.99).

No significant differences between groups were found for CSCY assistance seeking ($F(2,25)=.07$, $p=.79$, $d=.25$.).

Semi-structured child interviews

Semi-structured interview transcripts were analysed using a six stage Thematic Analysis process developed by Braun and Clarke (2006). Themes from child and parent interviews were developed in collaboration with the second author who is an experienced educational psychologist and researcher. This process involved transcribing the interviews and analysing the text. Quotes were highlighted from the text and placed onto a spreadsheet so that themes and sub-themes could be identified. In total, this process was completed over five one hour meetings. Table 4 shows the themes that emerged from the parent interview analysis and Table 5 shows the themes that emerged from the children interview analysis.

Of the nine parents interviewed seven talked about their children's challenging social and emotional needs ("We try to find out what makes him worried but he never wants to speak about it he just stays in his room"), six talked about the difficulties communicating with the school about interventions their children are receiving ("There are loads of things that people try with him and it would be nice to know what we could do as his Mum and Dad"). Four parents talked about a child's right to be different ("The school they try to do all these things with him but sometimes you have to ask does he really want them"), and the children learning to manage their behaviours as a result of the intervention ("Well his behaviour has got better, there's less outbursts but these don't happen in a day, do they").

The children's themes highlight how eight children mentioned the difficulties they were having processing complex emotions ("Yeah I feel anxious all the time I worry about things all the time like I worry in class I'm not going to understand something") and four children mentioned how they were trying to change their thought processes to influence their behaviour ("Well I think of a story in my head and I try to remember bits of that story to try and stop me worrying about it"). How many described the pressure they have to conform to social norms ("I said I have friends, not at this school but I have friends, and I can have fun with them I just don't have many friends at this school that's all and everyone keeps going on about it") and the influence the physical environment has on their engagement with the therapeutic process ("Yeah the one we were in was really small and it felt cramped in there. I didn't like that at all much").

Discussion

Analysis of the characterisation measures shows that children in the control and experimental group were comparative for autism severity and cognitive abilities. The groups were also comparative for total anxiety score, and coping behaviours measures. This suggests that changes in anxiety or coping measures are unlikely to be influenced by the child's cognitive ability or severity of autism.

The first hypothesis aimed to explore if children with autism who received the CBT intervention had reduced levels of anxiety compared to the control group. Analysis of the Spence Children's Anxiety Scale after the intervention had ended suggested that the children in the experimental group had reduced levels of anxiety compared to the control group. Whilst analysis of the follow-up data showed that the children's

anxiety had slightly increased compared to the post-intervention score, it was still significantly below the pre-intervention level. This finding was consistent from both parent and child reports and suggests that school based CBT programmes could be helpful for children with autism who experience anxiety. The reduced levels of anxiety experienced by children in the experimental group is consistent with the previous literature on the subject (Chalfrant, *et al.,* 2007; Sofrnoff, *et al.*, 2005; Sze and Wood, 2007; White, *et al.*, 2009; Wood, *et al.*, 2009 McConachie, *et al.*, 2014; Reaven, *et al.*, 2012).

The second hypothesis explored processes of change experienced by the children. It was hypothesised that children in the experimental condition would engage in less maladaptive coping strategies than the control group. Analysis of the data suggests that the children in the experimental condition were less likely to engage with behavioural avoidance strategies and more likely to engage in problem solving strategies, however no change was found between pre-intervention and post-intervention in respect of cognitive avoidance strategies. At follow-up the children in the experimental group were still using less behavioural avoidance coping skills and were maintaining their problem solving coping strategies. Interestingly, at follow-up the children were also found to be less likely to be using cognitive avoidance strategies. This could suggest that it took time for the children in the experimental group to employ cognitive coping skills to problem situations. This appears to be consistent with the parent interview data which highlighted the gradual process of behavioural change they noticed in their children ("You can tell he tries to think things through a bit more, err, logically in his head but he still finds it difficult to do") and the child interview data which highlighted that they were recognising how

thoughts and behaviours were related to one another ("Well it makes me think that I have only ever been pushed around on the playground a couple if times and I think those were by accident. So it helps me stop being worried by it all the time").

The parent and child interview data highlights the perceptions that parents have of their children's anxiety and how anger and anxiety can be interlinked emotions in children with autism ("It was the questionnaire you gave us that really made us understand just how anxious he is about things. I mean we were…'always', 'always', 'always' all the way through it."), which needs to be understood further. It further highlights the need for proper communication between parents and schools who are implementing interventions so that they are kept up to date with regards to their child's progress through the educational system ("He goes on all these things and we never know what they are for or how he has been getting on."). It also highlights the difficulties faced by parents and the complex interplay between conforming to social expectations, but also the child's right to be different and to express their personality how they see fit ("They school they try and do all these things with him but sometimes you have to ask does he really want to"). Anxiety in children in a complex condition that cannot be cured, but requires careful management especially as it transfers from one object or context to another ("It's the way he is. I mean we can help him with some things like being anxious around people and stuff, but it it's not one thing then it's just another really).

The child interviews highlighted how the children could reflect on processing complex emotions. For example, some children could highlight how they were beginning to recognise sources of their own personal anxiety and how physiology and

thoughts could be linked ("I had funny feelings in my stomach like what we talked about and well I knew That was because I was feeling slightly nervous about it."), which suggests that the psychoeducational component of CBT supports children with autism. Within this there was recognition that some emotions, particularly strong emotions, can be difficult to manage, and may at times become overwhelming ("Well people just keep calling me names and things and make fun of me and well it just winds me up so I get angry and when I get angry I find it difficult to stop what I am doing."). Some children were also able to reflect on the difficulties they have conforming to social norms ("I have what I need, I have friends and stuff but they well, I keep on being asked about it all the time."), with their diagnosis leading to extra scrutiny from supporting adults and the complex interplay between their desire to be alone, but also to make friendships ("I don't want to be on my" and "It never works and it makes me cross I don't want to be on my own I want friends I want people to come round to my house but I just can't do it" are quotes that came from the same child).

Study Limitations

This research offers encouraging insights into the potential effectiveness of school-based CBT programmes for treating anxiety in children with autism, and how it can change and support the development of more adaptive coping skills in this group of children. There are some limitations to the current study.

This study used the Spence Children's Anxiety Scale as the main outcome measure. Other blind based scales were not incorporated in to the research because of time and resource limitations. In addition, both children and parents were aware which

treatment group the children were in. The results, therefore, could reflect rater bias, so some caution needs to be applied to the interpretation of the data.

The participants were all male with no schools highlighting concerns with females with autism. Whilst epidemiological studies suggest children with autism are mostly male, future studies should incorporate females to investigate whether CBT delivered in schools is effective for this population.

This study aimed to investigate the impact of a CBT programme delivered in a school setting. Whilst the results are encouraging, future studies may want to focus on interventions delivered by school staff. As discussed earlier, CBT programmes have the potential to be delivered by a range of different individuals in different contexts and future studies should try to identify what level of training and familiarity with the children and their anxiety would be best to develop positive treatment outcomes for children with autism and how best treatment fidelity can be maintained.

Lastly, the low number of participants means some caution needs to be applied when interpreting the data. Secondly, the groups were randomized by schools. It is possible school contextual factors may have influenced the scores obtained and it would be helpful for future studies to have both a control and experimental group in the same school to help control for these factors. Thirdly, as there was no active control group, where children may receive another anxiety based intervention, it is hard to say if it is the CBT model that proved helpful to the children or if it was the time they had to discuss their anxiety and its management.

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Figure 1: Flow diagram showing school and participant recruitment

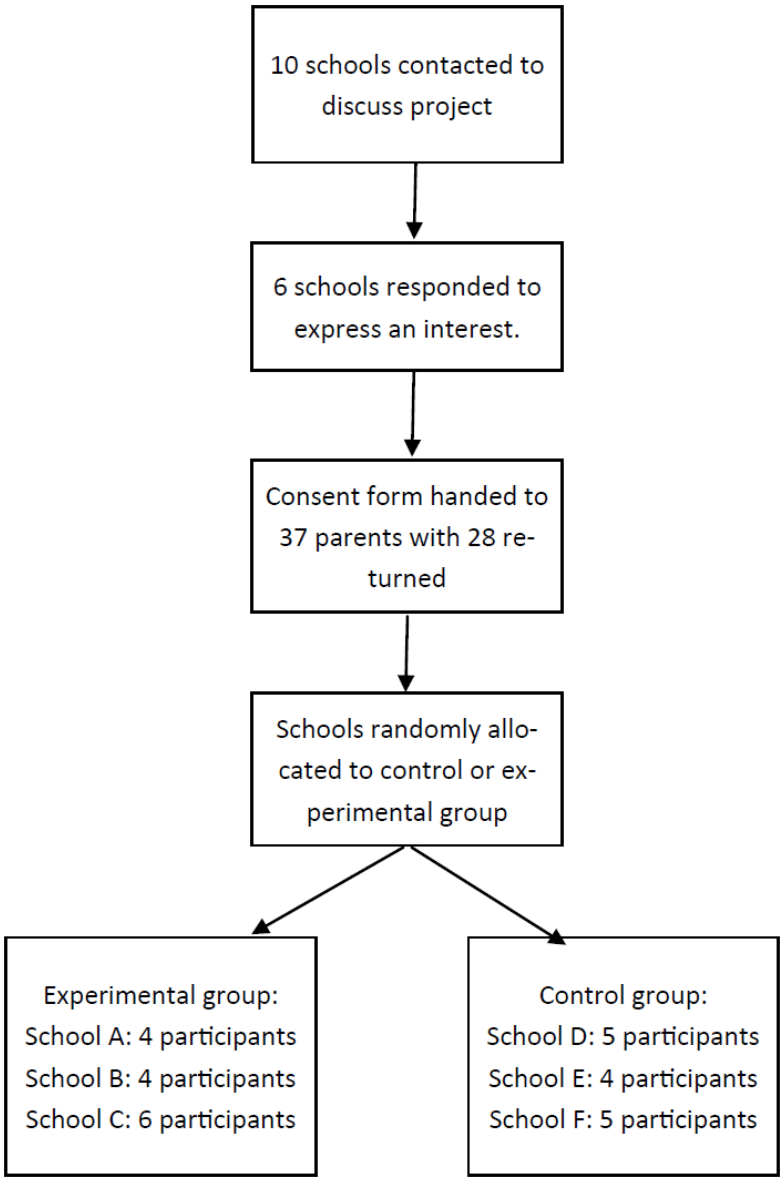

Table 1: Participant age (mean, sd), ethnicity and gender

		Experimental Group	Control Group
Age*		12.64 (.85)	12.86 (.7)
Ethnicity**	White British	13	14
	Chinese	1	0
Gender**	Male	14	14
	Female	0	0

*p = .475 (n.s.) **assumption of chi-square violated (more than 25% of values below 5) therefore not calculated

Table 2: Data collection points

		WASI	SRS	SCAS-C	SCAS-P	CSCY
Time 1	Pre-Intervention	Yes	Yes	Yes	Yes	Yes
Time 2	Post-Intervention	No	No	Yes	Yes	Yes
Time 3	6/8 Week Follow-Up	No	No	Yes	Yes	Yes

WASI Wechsler Abbreviated Scale of Intelligence; SRS Social Responsiveness Scale; SCAS-C Spence Children's Anxiety Scale –child version; SCAS-P Spence Children's Anxiety Scale – parent version; CSCY Coping Scale for Children and Youth

Table 3: WASI, SRS, SCAS-P, SCAS-C and CSCY at pre-intervention

			Count	Mean	Standard Deviation	Minimum	Maximum
WASI Total Score	Group	Experimental	14	97.71	11.37	81	121
		Control	14	106.57	13.93	83	135
		Total	28	102.14	13.27	81	135
SRS Total T Score	Group	Experimental	14	88.79	12.51	69	112
		Control	14	90.00	10.03	78	108
		Total	28	89.39	11.14	69	112
SCAS-P Total (pre)	Group	Experimental	14	34.86	15.40	15	61
		Control	14	33.21	8.46	22	47
		Total	28	34.04	12.22	15	61
SCAS-C Total (pre)	Group	Experimental	14	33.93	11.38	21	61
		Control	14	32.57	7.11	19	46
		Total	28	33.25	9.34	19	61
CSCY-AS (pre)	Group	Experimental	14	2.71	2.46	0	8
		Control	14	2.21	1.89	0	5
		Total	28	2.46	2.17	0	8
CSCY-PS (pre)	Group	Experimental	14	.93	1.14	0	4
		Control	14	1.29	1.38	0	4
		Total	28	1.11	1.26	0	4
CSCY-CA (pre)	Group	Experimental	14	4.86	2.74	0	9
		Control	14	5.86	3.70	0	14
		Total	28	5.36	3.23	0	14
CSCY-BA (pre)	Group	Experimental	14	3.79	3.09	0	9
		Control	14	3.00	2.54	0	8
		Total	28	3.39	2.81	0	9

SCAS-P Spence Children's Anxiety Scale - parent version; SCAS-C Spence Children's Anxiety Scale - child version; CSCY-AS Coping Scale for Children and Youth - attention seeking; CSCY-PS Coping Scale for Children and Youth - problem solving; CSCY-CA Coping Scale for Children and Youth - cognitive avoidance; CSCY-BA Coping Scale for Children and Youth - behavioural avoidance

Table 4: Mean and SD of SCAS-P, SCAS-C, CSCY (AS, PS, CA, BA) at T1, T2 and T3

		Mean (SD) T1	Mean (SD) T2	Mean (SD) T3
SCAS-P	Experimental	34.9 (15.4)	27.9 (9.6)	30.2 (11.2)
	Control	33.2 (8.5)	34.1 (8.4)	34 (8.9)
SCAS-C	Experimental	33.9 (11.4)	28.3 (9)	30.6 (10.5)
	Control	32.6 (7.1)	33.9 (6.4)	33.3 (6.1)
CSCY-AS	Experimental	2.71 (2.46)	2.71 (1.38)	2.43 (1.6)
	Control	2.21 (1.89)	2.21 (1.58)	2.07 (1.27)
CSCY-PS	Experimental	0.93 (1.41)	2.57 (1.7)	2.57 (1.4)
	Control	1.29 (1.38)	1.14 (1.23)	1.36 (1.01)
CSCY-CA	Experimental	4.86 (2.74)	3.5 (1.65)	2.71 (1.64)
	Control	5.86 (3.7)	5 (2.96)	5.07 (3.1)
CSCY-BA	Experimental	3.79 (3.1)	2.71 (1.49)	2.21 (1.72)
	Control	3 (2.54)	3.21 (1.72)	2.86 (1.51)

SCAS-P Spence Children's Anxiety Scale - parent version; SCAS-C Spence Children's Anxiety Scale - child version; CSCY-AS Coping Scale for Children and Youth - attention seeking; CSCY-PS Coping Scale for Children and Youth - problem solving; CSCY-CA Coping Scale for Children and Youth - cognitive avoidance; CSCY-BA Coping Scale for Children and Youth - behavioural avoidance

Table 3: Themes and subthemes from Thematic Analysis of parent interviews

Theme	Sub-theme
Child's anxiety responses are dynamic	Child's anxiety is constantly changing
	Anxiety is always present
	Parent thinks child should learn to deal with feelings independently
Contextual influences maintain behaviour	Changes in child's behaviours not support by an unchanged context
	Child's behaviours maintained by community perceptions and expectations
Learning to manage behaviour	Evidence of child engaging in increased thought and managing emotional responses
	Behaviour issues more controlled since intervention
Social stigma	Unpredictability of behaviour influences social contact
	Community reactions to behaviours are a stress for parents
Challenging social and emotional needs	Awareness that child thinks differently to peers
	Emotional responses are exaggerated
	Uncertainty in how to respond fuels anxiety
	Difficulty communicating emotions
	Difficulty developing strategies to cope with changes at home
	New Challenges posed by puberty
	Understanding that difficult behaviours reflect anxiety rather than anger
Tensions between home and school	Problems at school affect life at home
	Parents feel unsupported by and under pressure from school
Difficulties with social relationships and challenges in maintaining them	Problems coping with challenges in relationships
	The challenges of negotiating relationships with the opposite sex
The right to be different	Child under pressure to build friendships despite preference for solitude
	Imposing social norms on the ASD child without taking their views into account
Inadequate communication with parents about school based interventions	Parents feel excluded from school based interventions
	The need for agreed aims as the basis for interventions and joint evaluation of outcomes

Table 4: Themes and subthemes from Thematic Analysis of child interviews

Theme	Sub-theme
Changes in thought process influence behaviour	Increase in thought processing
	Using personal narratives to change thoughts and behaviour
	Changing thoughts to change behaviour
	Developing evidence based thinking
Learning to process complex emotion	Learning to link physiology and thoughts
	Recognising sources of personal anxiety
	Making sense of emotions in self and others
	Differentiating anger and anxiety
	Developing emotional self-awareness
	Problems managing strong emotions
Pressure to conform to typical social norms	Preference for social isolation
	Desire for friendship
	Finding others hard to interact with
	Feeling under scrutiny and pressure to confirm to typical friendship patterns
The influence of the physical environment and social context on engagement in the therapeutic process.	Physical Environment and Space
	Group Dynamics

Appendix 1: Semi-structured interview used with children and parent at post-intervention

General introduction:

Introductions (*me, my role and why I am speaking to them*)

The right to withdraw at anytime

This is being recorded, do you consent/are you happy to proceed?

What we will do with the interview data

Transcribed

Analysed

Used in doctoral thesis

Securely stored

Check for understanding (*Ask them, if necessary, to repeat back key points of what I have said; Based on what I have told you are you happy to proceed?*)

Child:

Talk to the child about different emotions they have had recently (try to get the child to talk about 'good' or 'happy' experiences as well)

Reflect on an experience they found difficult recently (*what was different to the happy/good experiences?)*

Physiological (sweating, pounding heart) reaction to the event

Thoughts about the event (What were they thinking? Did they think about any other options?)

What emotions were they experiencing?

- What was the outcome? (*What did they do? What options did they consider? Why did they choose this outcome?*)

If this happened again, would they do anything differently?

Talk to the child about the classroom (where do you sit? who do you work with? what are your favourite subjects (why do you like them? What about *subject?*)) Develop this to find probing questions about their thoughts, feelings and emotions in the classroom and what strategies they use.

Parent

What is their understanding of ASD

Communication (sharing experiences, mannerisms)

Social interaction (friendships, social rules/etiquette)

Rigid behaviours (interests, other interests, taking part in other peoples' games, rules)

Using their understanding, how does this impact on their child's behaviours.

What sort of feelings/emotions do you see in your child.

How does he cope with these behaviours and feelings?

What does anxiety look like to the parent?

Physiological?

When has he done something which they thought would be difficult, but he was okay with (*what was different? why was it surprising about it?)*

What coping behaviours did they use (avoidance, etc)

What is your understanding of his behaviours in school/classroom (*what have you heard from teacher's, your child's friends, etc*)
Have you noticed any changes in *child's name* recently?